DOCUMENT RESUME

ED 289 076 CE 049 310

AUTHOR Davis, Joseph L.
TITLE Relationship of the Industrial Arts/Technology Curriculum to Vocational Education in Ohio.
INSTITUTION Ohio State Council on Vocational Education, Westerville.
PUB DATE 85
NOTE 28p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Coordination; *Curriculum Development; *Educational Cooperation; Educational Research; *Industrial Arts; Integrated Curriculum; Secondary Education; State Surveys; *Technology; *Vocational Education
IDENTIFIERS *Ohio

ABSTRACT

Twelve industrial arts (IA) teachers and supervisors were interviewed to obtain information on the significant changes that have occurred in the goals of IA. The issues were the present status of the IA curriculum in Ohio, the contribution IA makes to vocational education, the relationships between IA and vocational education, and provision for coordination between IA and vocational education. The study found a concentrated effort underway to reform the industrial arts curriculum, including a name change and corresponding emphasis on technology, new purposes, the clustering of curriculum content, and a recognition of the importance of including the manufacturing process as a part of the IA/Technology curriculum. Contributions that IA makes to vocational education included opportunities for awareness, orientation, and exploration; a basic core of technological skills and knowledge; potential for provision of alternative, hands-on modes for attaining basic skills; inculcation of technological literacy in youth; and reinforcement of learning from other subjects. Participants indicated that IA-vocational education relationships were enhanced by coordination efforts and participation by IA staff in vocational education at the state level; involvement of IA and vocational education student organizations with each other; and exchange visits between IA and vocational education personnel in the field. (YLB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Relationship of the Industrial Arts/Technology Curriculum to Vocational Education in Ohio

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

J Davis

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

Membership of the Ohio Council on Vocational Education

The Ohio Council on Vocational Education, is an agency, separate from the State Board of Education, composed of thirteen concerned citizens representing business, labor, agriculture, education, and various groups with special needs. The Council is dedicated to the concept that vocational education as well as general academic education is necessary if Ohio is to continue its economic growth and development.

Ohio Council on Vocational Education - FY 86

Mr. Harry J. Barth
Vice President, Research and Development
The Hygenic Corporation, Akron
Representing Industry

Ms. Dianne Biggs
Labor Representative
United Way of Franklin County
Columbus
Representing Labor

Dr. Rosie N. Doughty
Superintendent
East Cleveland City Schools
Representing Disadvantaged

Mr. Robert Y. Farrington
Secretary-Treasurer
Ohio State Building and
Construction Trades Council
Representing Labor

Dr. Leonard D. Kingsley
Superintendent
Penta County Vocational School
Perrysburg
Representing Special Education
Executive Committee - Second Vice Chairperson

Mrs. Judith A. Maxson
Dean of Technical Education
Hocking Technical College
Nelsonville
Representing Women; Postsecondary Education
Executive Committee - Secretary

Mr. David L. Myers
Supervisor, Student Services
Vantage Joint Vocational School
Van Wert
Representing Career Guidance and
Counseling Organizations

Ms. Mary E. Purcell
President, Mary Purcell & Associates
Cincinnati
Representing Small Business; Ohio
Job Training Coordinating Council

Mr. R. Thomas Scherer
Director, Vocational & Technical Training
Toledo Area Chamber of Commerce
Representing Business
Executive Committee - First Vice Chairperson

Mrs. Helen Scheuring
Agriculturist & Industrial Park Developer
Rock Creek
Representing Agriculture

Mr. Glenn E. Selby
Retired Manager, Armco Research Administration
Middletown
Representing Industry
Executive Committee - Chairperson

Mr. Saul A. Torres
Admissions Officer
Lorain County Community College
Elyria
Representing Limited English Proficient
Students; Postsecondary Education

Miss Coretha A. West
Teacher, Health Careers Center
Cleveland
Representing Minorities
Executive Committee

Staff

Dr. Martin W. Essex
Executive Director

Dr. Ralph E. Bender
Research Consultant

Mrs. Chloe Worley
Administrative Assistant

Foreword

Significant changes have taken place in the goals of Industrial Arts in the recent decades. Unfortunately, very little communication has appeared in the educational journals which would acquaint educators with these movements. This publication, Relationship of the Industrial Arts/Technology Curriculum to Vocational Education in Ohio, is one attempt to fill this void of communication. Industrial Arts Education is an integral part of the total educational program.

The cluster development, which is described in this study, brings forward change that offers abundant evidence for improvement.

Perhaps of more significance, however, is recognizing Industrial Arts as a force which can aid students in understanding the technological era of our time. Hence, you will have noticed that the name has been changed to include technology.

Another movement is the recognition of the importance of the inclusion of the manufacturing process as a part of the Industrial Arts/Technology curriculum.

This study also may be a stimulus to the persons who are associated with the Industrial Arts/Technology subject area. If it adds to a discussion which leads to the further clarification and advancement of such significant movements as the cluster development, technology knowledge, and awareness of the manufacturing process, it will have merit of considerable worth.

The faculty may become better informed so that cooperation is encouraged and community understanding is improved. Thus, a faculty meeting or other means of dissemination may accelerate communications which have received only limited attention. Both Industrial Arts/Technology and Vocational Education may enhance their effectiveness.

Readability of this research is facilitated by a condensation of 146 pages to its present length. Dr. Joseph L. Davis, Adjunct Professor at The Ohio State University, conducted the research.

Glenn E. Selby

Glenn E. Selby, Chairperson

Martin W. Essex

Martin W. Essex, Executive Director

Contents

Foreword	1
Background of the Study	3
Purpose	3
Design	3
Interview Guide	4
Written Testimony	4
Literature Search	4
Nature of the Industrial Arts Curriculum in Ohio	5
Target of Reform	5
New Terminology and a Departure from Tradition	5
A New Definition	6
A New Philosophy	6
New Purposes	7
A New Organization of Content	8
A New Rationale	9
Bridging the Gap in Ohio Between the 1940's and Today	11
Facts, Figures, and Selected Observations	12
Contribution of Industrial Arts to Vocational Education	15
Relationships Between Industrial Arts and Vocational Education	17
Conclusions	20
Recommendations	23
References	24

Background of the Study

Purpose

The original charge given the investigator identified four purposes for this study: (1) to identify the nature of the industrial arts curriculum in Ohio, (2) to determine the contribution of industrial arts to vocational education, (3) to generalize the findings in terms of existing and desirable relationships and coordination between industrial arts and vocational education, and (4) to compile a report that would provide useful information for laymen and generalists in education as well as specialists in industrial arts and vocational education.

Design

The procedure employed in this study involved nine steps, which may be listed in sequential order as follows:

1. The scope of the study was defined in conferences with the executive staff of the Ohio Council on Vocational Education.

2. At the outset, the investigator and the executive staff of OCOVE determined that data-gathering would emphasize interviews with industrial arts and vocational education leaders in Ohio. Later, a decision was made to solicit written testimony from field practitioners.

3. A jury of five authorities was drawn from the Ohio Department of Education and the executive staff of OCOVE to select interview subjects for this study.

4. A limited search of the literature was conducted.

5. A 23-item interview guide was developed by the investigator and critiqued by the executive staff of OCOVE.

6. Interviews were recorded on cassette tapes. A 134-page typescript was prepared from the cassette tapes and placed on file with OCOVE.

7. The Elementary and Secondary Schools Minimum Standards document was reviewed.

8. A variety of other published materials -- including newsletters, administrative bulletins, audio-visual hardcopy, conference programs, committee and task force reports, bulletin-board posters, and speech manuscripts -- were examined.

9. Data gathered through the processes listed above were then analyzed in terms of the purposes of the study, and this report was written.

Interview Guide

The content of the interview guide that was administered to eleven individuals in this study emerged from a limited review of the literature and a series of conferences involving the investigator and the executive staff of OCOVE. The 23 items in the final draft of the interview guide were designed to elicit information in response to the following general questions:

1. What is the present status of the industrial arts curriculum in Ohio?

2. What kind of contribution does the industrial arts curriculum make to vocational education in Ohio?

3. What kind of relationships exist between the industrial arts curriculum and vocational education in Ohio at the present time?

4. What kind of provision is made for coordination between the industrial arts curriculum and vocational education in Ohio at the present time?

Written Testimony

Written testimony, based on the interview guide, was received from twelve practitioners in the field. Most of these respondents were industrial arts teachers or supervisors.

Literature Search

Abstracts of 37 pieces of literature provided by Educational Research Service, Inc., Arlington, Virginia, were reviewed. From this source and material provided by interview subjects, a total of 29 pieces of literature were selected for use in this study.

Nature of the Industrial Arts Curriculum in Ohio

Target of Reform

This study found that a concentrated effort is under way in Ohio to reform the industrial arts curriculum. The extent to which this effort is successful could go a long way toward redefining the relationship between the industrial arts curriculum and vocational education.

The reform effort is being spearheaded by industrial arts consultants in the Ohio Department of Education, teacher-educators at major universities in the state, and the leadership of the Ohio Industrial Arts Association (OIAA).

The action plan being implemented by Ohio's industrial-arts leaders is comprehensive in scope and thorough in detail. It is designed to accelerate a development process characterized as "gradual" by E. Keith Blankenbaker in The Status of Ohio Industrial Arts -- 1980. [1]

New Terminology and a Departure from Tradition

As an indication of the sweep of their intent, the reformers appear to be retiring the term "industrial arts" and replacing it with "technology education" or "industrial arts/technology education." They are not alone in making this change in terminology. During the Spring of 1985, members of the American Industrial Arts Association voted by a two-to-one margin to change the name of their organization to the International Technology Education Association.

The movement that is gathering momentum in Ohio is part of a national trend. Kenneth Phillips, a professor in the Department of Technology at California State University, Los Angeles, has traced the origin of the national stirrings to the period immediately after World War II. He notes that this period was characterized by "phenomenal efforts in curriculum study, reports, and recommendations." [2]

Phillips credits the development of the first post-war curriculum proposal to William E. Warner and a group of graduate students at The Ohio State University, who published A Curriculum to Reflect Technology in 1947.

A New Definition

Ohio's reformers give evidence of subscribing to a new definition of industrial arts. The time-honored definition was perhaps best captured by the Industrial Arts Policy and Planning Committee of the American Vocational Association, which stated: "Industrial Arts is the study of industrial tools, materials, processes, products, and occupations pursued for general education purposes in shops, laboratories, and drafting rooms."[3] It is interesting -- and perhaps significant -- to note that technology is not explicitly mentioned in this definition.

In sharp contrast, industrial arts now is defined by The Technical Foundation of America (TFA) as "a comprehensive educational program concerned with technology -- its evolution, utilization, and significance; with industry -- its organization, personnel, systems, techniques, resources, and products; and the social/cultural impact of technology and industry."[4] (Emphasis added)

A New Philosophy

The TFA definition is reflected in a relatively new statement titled "Philosophy of Industrial Arts in Ohio." According to one of the industrial arts consultants in the Ohio Department of Education interviewed in this study, this statement was drafted "by a group of people representing teachers, teacher-educators and (industrial arts) supervisors in 1978." The full text of the statement is as follows:

> In Ohio, industrial arts is an appropriate part of the learning experiences of all students, at all grade levels, and all abilities. As a result of these learning experiences, today's youth will be able to function in, contribute to, and learn to effectively control their industrial/technological environment as well as explore career possibilities.
>
> Industrial arts education embodies a broad area of study incorporating many instructional procedures, manipulative activities, and value developments. These educational activities result in physical, intellectual, and psychological human growth potential.
>
> While the experiences of the student in tools, materials, and processes provide useful information and skills for immediate use, these same experiences foster awareness of environmental, economic, social, technical, political, and cultural factors reflected in a constantly changing world.[5]

Although this statement of philosophy has been widely distributed during the past seven years, close observers of Ohio's public schools interviewed in this study disagree on the extent to which classroom and laboratory practices now mirror the concepts expressed in the statement. The most optimistic appraisal came from an industrial arts consultant in the Ohio Department of Education, who estimated that "seventy percent of all the people in industrial arts in the state of Ohio are adopting and trying to implement" the new concepts. A different view was expressed by another Department official, who expressed "shock" that among well qualified industrial arts teachers who had been trained in the new concepts, few "would acknowledge that they do anything other than the traditional industrial arts." Data obtained in a 1984 curriculum survey conducted by the Ohio Department of Education reflect a picture between these extremes.

New Purposes

Interviews conducted and written testimony obtained during this study revealed that professional leaders ascribe at least a dozen purposes to the newly conceptualized industrial arts curriculum. The four purposes cited most often by interview subjects were: to develop technological literacy; to provide exploratory experiences in the world of work; to provide opportunities to develop skills with tools, materials, and processes; and, at the elementary level, to reinforce academic learnings in the basic skills and science.

One of the most coherent responses was offered by an officer of the Ohio Industrial Arts Association (OIAA), who said the purpose of industrial arts/technology education is to produce individuals who are "able to participate in, and adapt to, a dynamic industrial and technological society." He elaborated on this point, identifying five pupil-outcomes of instruction, as follows:

> Consistent with their abilities, interests, and needs, learners shall (1) appreciate the evolution of industry and technology, (2) establish values related to the impact of industry and technology and how it alters our environment, (3) develop knowledge and abilities to use tools properly, as well as apply techniques and resources of industrial and technological systems, (4) develop creative solutions to present and future societal problems (by) using technical means, and (5) develop human potential for responsible citizenship, work, and leisure.

In summary fashion, the contemporary purposes of industrial arts education were succinctly stated by Michael J. Dyrenfurth, professor of industrial education at the University of Missouri, in a presentation to the National Association of State Directors of Vocational Education in 1983. Dyrenfurth said, "There is a high degree of national consensus on the purposes of industrial arts."[6] He listed seven purposes, based on samples of principals, guidance coordinators, and industrial arts chairpersons. The seven:

Developing skill with tools and machinery.
Providing technical knowledge and skill.
Discovering and developing creative talent.
Developing leisure-time pursuits.
Developing problem-solving skills.
Making informed occupational choices.
Providing prevocational experiences.[7]

A New Organization of Content

The approach to curriculum organization espoused by the authors of A Curriculum to Reflect Technology was regarded as novel when this document was published in 1947.[8] Today, the same approach is advocated in common by industrial arts consultants in the Ohio Department of Education, teacher-educators, and the leadership of the Ohio Industrial Arts Association.

What they advocate is the clustering of curriculum content into four areas -- construction, energy/power, communication, and manufacturing -- so that pupils may pursue in-depth studies of the basic concepts of industry and technology. These concepts "include the production and servicing of products, application of mechanisms, creation of new ideas for products, consumer literacy, career opportunities related to industry and technology, productivity, and quality control," according to an officer of the Ohio Industrial Arts Association interviewed in this study.

A notable shift in emphasis is implicit in such thinking about the industrial arts curriculum. In simplest terms, instruction is shifted from an industrial crafts base (wood-working, metalworking, drawing, etc.) to a technological base. Industrial arts/technology education still makes use of the traditional areas, however, but not as subjects taught in isolation; these areas are integrated into the study of the four technology clusters. For example, woodworking no longer is pursued for the purpose of completing a project; it is employed for the purpose of teaching concepts indigenous to construction, manufacturing, etc.

How difficult is it to shift from the traditional organization of industrial arts subject matter to a technology-based curriculum? Ernest N. Savage and Terry Squier took note of this question in the May, 1984, issue of The OIAA Newsletter and said:

> There has been a great deal of concern among industrial arts teachers about the shift from teaching Woods and Metals to teaching Manufacturing. The plain truth is that you don't have to make drastic changes in your traditional program to allow for the addition of manufacturing content; you just need a bit of restructuring. [9]

One of the interview subjects in this study, an officer of the Ohio Industrial Arts Association, addressed himself to the same topic, saying: "In all likelihood woodworking labs will be converted to construction, metalworking labs to manufacturing, and drafting rooms will become communications labs."

What about the "new" industrial arts at the elementary school level? Interview subjects included in this study said that industrial arts should be integrated with the curriculum to enrich instruction in the basic skills and sciences by providing technical activities that make such subjects more meaningful.

A New Rationale

The new terminology, the departure from tradition, the new definition, the new philosophy, the new purposes, and the new organization of content discussed above could hardly have materialized out of thin air. It is a fact that they did not; they sprang from a new rationale, which is clearly discernible in the literature of industrial arts/technology education. The new rationale is rooted in the growing recognition of the ascendancy of technology in human affairs.

Writers have been struck by technological changes and the accelerating rate of change. For example, Walter B. Waetjen, President of Cleveland State University, had this to say:

> . . . it is clear that the fabric of American society has changed, is changing, and will continue to change. The major theme is that technology has wrought changes in the way we live and work. The subtheme is inescapable: More education is required as technology becomes more complex.[10]

The new rationale for industrial arts/technology education embraces a broad definition of technology and emphasizes its impact on human beings. This postion is exemplified well by Willis E. Ray, who commented as follows:

> The term "technology" is often thought to be restricted in meaning to considerations of hardware or mechanical things. It has a much broader meaning. Technology encompasses the total spectrum of the knowledge of efficient human behavior. Technology is the product of organized, disciplined study of the practices of man. It has to do with all of the practices which ultimately affect individual and social human behavior." [11]

A colleague of Ray, Donald G. Lux addressed himself to one of the cardinal points in the new rationale for industrial arts/technology education; namely, that it is getting insufficient attention in school programs, if it is being taught at all. Said Lux: "Unfortunately, it cannot now be stated that there is widespread recognition of the need for incorporating technology education into the common school program."[12] He went on to cite a passage from High School, a report published by The Carnegie Foundation for the Advancement of Teaching in August, 1983, which declared: "We are quite frankly disappointed that none of the schools we visited required a study of technology." [13]

It naturally follows that another fundamental point in the new rationale for industrial arts/technology education is: "Something must be done to prevent us from becoming a technologically illiterate nation," as stated by The Technical Foundation of America.[14] Blankenbaker minced no words on this subject in his "President's Message" to members of the Ohio Industrial Arts Association in the September, 1984, issue of The OIAA Newsletter. He wrote:

> We are being challenged to upgrade our programs to reflect contemporary technology and make a unique contribution to the education of youth who will lead our nation in the 21st century. We have the skills necessary to accomplish this task. Industrial arts/technology education is the only program area in the school which can enable students to achieve "technological literacy." By gaining experience and skill in the production and servicing of industrial products, exploring career opportunities, developing consumer skills, and experiencing the interrelatedness of all school disciplines, Ohio's youth can achieve technological literacy. Given the nature of contemporary society, what could be more important . . . more BASIC? [15]

The emphasis on providing industrial arts/technology education for all students has been interpreted by consultants in the Ohio Department of Education to specifically include females and pupils enrolled in special education programs. This study obtained ample evidence of efforts toward that end.

The new rationale for industrial arts/technology education holds that "students who go through an articulated technology education program should be prepared for any one of three possible career goals" upon graduation from high school.[16] The American Industrial Arts Association (now The International Technology Education Association) has identified these goals in this manner:

> As a result of taking a technology education program in grades K-12, the student may wish to enter college as an engineering, scientific, architectural, or technical baccalaureate degree major. Another career path is for a technology education student to pursue a vocational career after graduating from high school. (This may also be done in high school if appropriate vocational courses are offered.) Finally, a student may take technology education for general education purposes to make him or her better prepared to live in a technological world.[17]

Finally, it needs to be recorded that the new rationale for industrial arts/technology education places this subject matter squarely in the province of general education.

Bridging the Gap in Ohio Between the 1940's and Today

A review of the interviews conducted during this study and an examination of the literature and written testimony obtained point to the conclusion that industrial arts reform proposals dating back to the late 1940's had little, if any, impact on instructional practices in Ohio for nearly thirty years.

The winds of change apparently did not begin to blow until the mid-1970's when the then-State Superintendent of Public Instruction hand-picked a teacher with experience in the technology-cluster concept to assume administrative responsibility for industrial arts at the staff level in the Ohio Department of Education.

In January, 1976, a Committee of Thirty was convened to develop a complete industrial arts curriculum based on the cluster concept. Six clusters were employed at that time. It is significant to note that ten members of the Committee were classroom teachers; ten, supervisors; and ten, teacher-educators.

Some five years later, Clarification Conferences were convened by teacher-educators to identify "the minimum body of content in the technical areas" that all prospective teachers should have, an officer of the Ohio Industrial Arts Association reported. An important by-product of the Clarification Conferences was a reduction in the number of curriculum clusters from six to the four now being promoted by the state's industrial arts leadership.

By the Spring of 1983, it appears as if Ohio's industrial arts reformers had caught their second wind and were ready to launch a renewed effort to redirect the curriculum. At that time, the Ohio Industrial Arts Association conducted a long-range planning conference and adopted six major goals.[18]

A long-time teacher-educator senses that implementation of OIAA's long-range plan and other recent initiatives are producing results. When interviewed during this study, he said, "The people within the industrial arts cadre, those 2,000-plus people out there in the state, are being swept up finally in the movement to switch from the arts of industry to the technology of industry. That's only happened in the last two years." (Emphasis added)

A consultant in the Ohio Department of Education points to May, 1984, as a critical juncture in the reform movement. That's when a document titled Industrial Technology Systems Resource Handbook was completed in draft form. During the 1984-85 school year, a total of 108 teachers participated in a series of three workshops to critique and re-write the contents of this document after field-testing it in their classrooms. The final draft is being published and distributed by the Ohio Industrial Arts Association.

Facts, Figures, and Selected Observations

To round out a commentary on the "Nature of the Industrial Arts Curriculum in Ohio," it is necessary to record certain basic facts and figures and to report on observations having special pertinence to this study.

Enrollment Totals and Trends. A review of the literature leads to the conclusion that approximately 500,000 pupils have been enrolled in industrial arts courses in Ohio schools during recent years. This estimate is derived from data reported in The Status of Ohio Industrial Arts -- 1980.[19] Field practitioners who provided written testimony for this study indicate that total enrollment is "declining somewhat."

Enrollment of Female and Special Education Pupils. The 1980 Status report indicated that females accounted for 20.6 percent and special education pupils for 1.9 percent of the total enrollment in industrial arts.[20] All of the field practitioners who provided written testimony on this matter reported that female enrollment appears to be increasing.

Enrollment by Course and Grade Level. The 1980 Status document also reported that six of nineteen course categories employed in the Blankenbaker study,[21] woods, drafting, metals, general industrial arts, crafts, and graphic arts, accounted for 81.6 percent of the total industrial arts enrollment.

Although enrollment figures by grade level were not included, tabular data in the 1980 Status report do portray the grade-level concentration of industrial arts course offerings in Ohio secondary schools at the time that study was conducted. These data indicate that the heaviest concentration was at the tenth grade level.[22] If a value of 1.00 is assigned to the tenth grade, the relative concentration of courses at other grade levels may be portrayed as follows: seventh grade, 0.40; eighth grade, 0.61; ninth grade, 0.82; eleventh grade, 0.71; and twelfth grade, 0.41.

At the elementary level, 87 percent of the respondents in the 1984 curriculum survey conducted by the Ohio Department of Education indicated that "no elementary industrial arts experiences (were) provided or offered."[23]

Facilitants and Constraints. The industrial arts/technology education curriculum facilitants cited most often by participants in this study were: local boards of education that believe the program is good for all pupils, the large number of successful teachers who have an understanding of young people and the subject matter, the availability of laboratories in nearly all junior and senior high schools in the state, the enjoyment students get from the activity-centered approach to instruction, the broad-based community support afforded some schools, the leadership provided by a strong state association (OIAA), and the consensus and cooperation that exist between the teacher-education institutions in the state and the staff of the Ohio Department of Education.

Curriculum constraints identified by participants in this study included: lack of public understanding of the necessity of providing industrial arts/technology education for all youth, the failure of many programs in the state to reflect current technology, the assumption of some administrators and vocational educators that industrial arts is only

a pre-trades and industries program, the fact that the new state minimum standards do not require industrial arts at the middle school and junior high school level, the increased requirements for high school graduation coupled with the designation of additional specified courses for graduation, lack of state funding for industrial arts, the lack of initiative on the part of some teachers to improve and update themselves and their programs, questions relating to the kind of facilities required for the new industrial arts/technology education program, and the tendency of some guidance counselors to channel less capable pupils to industrial arts courses.

New State Minimum Standards. -- The new standards, which became effective on September 1, 1983, are silent on industrial arts in Grades K-6; specify that time may be allocated for industrial arts instruction in Grades 7 and 8; and require that among the minimum of 45 units that must be scheduled in Grades 9-12, two units shall be in industrial arts.[24] Under the old minimum standards, two units of industrial arts were required at the junior high school level and three at the high school level.

How have the changes affected industrial arts? Participants in this study indicated that some junior high schools are dropping industrial arts from their course of studies entirely, while other junior highs have reduced it from required to elective status. One interview subject spoke to a reduction in opportunity for pupils to engage in career exploration and educational decision-making activities.

Contribution of Industrial Arts to Vocational Education

Advocates of industrial arts/technology education have no difficulty in identifying the contributions that industrial arts makes to vocational education. But there's one thing they want laymen and generalists in education to understand: In addition to making a contribution to vocational education, industrial arts also contributes to all other areas of the school program, including the college-prep curriculum and special education.

A review of the interviews and the written testimony obtained in this study leads to the conclusion that the individual expressions of participants may be accurately summarized by citing the presentation of Michael J. Dyrenfurth to the National Association of State Directors of Vocational Education. Dyrenfurth said:

- Vocational education can use industrial arts' broad-based technological cluster programs for awareness, orientation, and exploration purposes. . . .
- Vocational education can use industrial arts to establish a basic core of technological skills and knowledge that is eminently transferable to a multitude of occupational preparatory programs.
- Industrial arts serves as one of the vocational education continuum's programs with perhaps the most potential for providing an alternative, hands-on mode for attaining many of the basic skills taught by other subjects. . . .
- Industrial arts in its advanced laboratories can provide the initial phase of occupational preparation for many jobs requiring a technological base.
- Industrial arts is the component of the vocational education continuum best equipped to inculcate technological literacy in the greatest number of our in-school youth.
- Through effective learning activities, industrial arts can, just as the other vocational service areas do, reinforce learning from other subjects -- usually by providing a relevant application for such principles, concepts and skills.
- Industrial arts often serves as a very effective mechanism to alert and encourage students to pursue vocational education opportunities. [25]

A consultant in the Ohio Department of Education illustrated the contribution industrial arts/technology education can make to vocational education by pointing to the construction-technology course offered to ninth and tenth graders at a high school in Franklin County. He said the teacher has his pupils "build a three-quarter scale house right in the shop." Each pupil participates in a broad range of learning experiences while the house is going up. By the time the house is completed, pupils will have been exposed "to thirteen different career opportunities they could use in the eleventh grade if they want to," according to the State Department consultant. He added, "Most people think that if you talk about building a house, the only person involved is a carpenter. That's untrue and (that's what the teacher) hopes to make pupils understand."

Relationships Between Industrial Arts and Vocational Education

Participants in this study were expansive in their comments about the relationship between industrial arts and vocational education. One interview subject set the stage for exploring this topic by observing that industrial arts and vocational education "live under two very different traditions. . . . If there is going to be a close relationship, then it will come about because people recognize these differences and somehow surmount them." Another interview subject put it this way: "If this is going to be a marriage, I think both camps have to be committed to it and see that it works. You might say that we've got that now." Both of these interviewees hold positions of broad responsibility in the Ohio Department of Education under different assistant superintendents of public instruction.

Five differences between industrial arts and vocational education were identified by participants in this study. These differences are as follows:

- Industrial arts is part of general education; vocational education makes use of the outcomes of general education.
- Industrial arts is supported by general funding; vocational education is partially supported by categorical funding.
- Virtually all curriculum decisions about industrial arts are made locally; many curriculum decisions about vocational education are made at the state level.
- Industrial arts is viewed as appropriate for elementary pupils as well as secondary pupils; vocational education is limited to eleventh and twelfth graders.
- In terms of equipping pupils with job-entry skills, industrial arts is occupationally non-specific; vocational education is occupationally specific.

This study identified formal relationships between industrial arts and vocational education in three locations: federal law, the administrative organization of the Ohio Department of Education, and the state's allocation of vocational funds.

At the federal level, industrial arts was added to the Amendments to the Vocational Education Act in 1972, and industrial arts was made eligible for vocational education funds in 1976.[26] The Carl D. Perkins Vocational Education Act of 1984 (P.L. 98-524) refers to industrial arts as "being a pre-vocational program for which federal vocational dollars can be expended," according to a vocational educator interviewed in this study. He characterized the relationship resulting in Ohio under this Act as "more a legality than a programmatic . . .thing."

An examination of the organization chart of the Ohio Department of Education reveals that:

- Two industrial arts consultants are assigned to the Support Services Section of the Division of Elementary and Secondary Education headed by Director Mary J. Poston, who reports to Assistant Superintendent G. Robert Bowers.
- The Division of Vocational and Career Education, headed by Director Darrell L. Parks, operates under Assistant Superintendent William L. Phillis.

Three other units with which the industrial arts consultants have frequent dealings are positioned as follows:

- The Career Development Service operates under Dr. Parks' Division.
- The Office of Sex Equity operates under Assistant Superintendent Irene G. Bandy.
- The Division of Special Education, headed by Director Frank E. New, operates under Assistant Superintendent Raymond A. Horn.

Although the over-all organization of the Ohio Department of Education is demonstrably rational, the opportunity for industrial arts consultants to "get things done" appears to be limited by the organizational structure.

Participants in this study indicated that the Ohio Department of Education allocated $128,000 to the industrial arts budget for 1984-85, with virtually all of this amount coming from vocational sources. Participants in this study provided literature that indicated that other states, including California, Texas, Connecticut, and Florida, are more generous in their allocation of vocational funds for industrial arts.[27]

The allocation of $128,000 is used to fund the positions of the two consultants, program development, and in-service workshops.

According to participants in this study, industrial arts-vocational education relationships are enhanced by: coordination efforts between the directors of elementary and secondary education and vocational education at the state level; recognition by state leaders in vocational education that industrial arts contributes to the goals and objectives of vocational education; the cordial personal relationships that exist between industrial arts and vocational education personnel at the state level; participation of industrial arts personnel in vocational education staff meetings at the state level; involvement of industrial arts student associations with vocational student associations; inclusion of an Industrial Arts Division in the Ohio Vocational Association; exchange visits between industrial arts personnel and vocational education personnel in the field; and the appearance of industrial arts educators before the Ohio Council on Vocational Education last year.

Participants in this study identified the following constraints to industrial arts-vocational education relationships: the failure to specify a relationship in writing in the state's Vocational Education Plan; increased demands on the time of industrial arts personnel at the state and local levels; fear of duplication of vocational education programs by industrial arts; competition for pupils during a time of declining high school enrollment, increasing graduation requirements, and specification of additional academic coursework; lack of vocational funds for industrial arts, compared to the allocations made by other states; and low membership of industrial arts educators in the Industrial Arts Division of the Ohio Vocational Association.

Conclusions

Significant developments are taking place in industrial arts/technology education in Ohio. New concepts have emerged to influence curriculum thinking and teacher education. These new concepts and the developments they have triggered appear to be in tune with the direction the national economy is heading and responsive to the most pervasive force in the economy: accelerating technological change.

Ohio's industrial arts/technology education reformers apparently have decided to heed the words of Earl C. Joseph, who observed that the forces of accelerating change

> . . . can be turned to the conscious creation of desired futures. Instead of controlling the future by limiting the rate of change, we can capitalize on rapid change by programming away the problems we can foresee and by programming in the desirable opportunities we are capable of imagining.[28]

It is good that the reformers, aided by a corps of volunteer professionals, have taken the initiatives they have, because the traditional approach to industrial arts in Ohio appears to be in trouble. For example, G. Robert Bowers, Assistant Superintendent of Public Instruction for the State of Ohio, has written:

> Caught between the press of increased attention for a traditional college preparatory curriculum and emphasis on vocational education, there are some who believe that industrial arts has been, or ought to be, squeezed out.[29]

When interviewed in this study, a colleague of Dr. Bowers sounded a note of urgency, saying, "I think we have to salvage (industrial arts) quickly, or we're going to lose it completely because of what I see happening in the schools."

The salvage operation that was begun in Ohio in the mid-1970's and renewed with increased vigor during the past two years appears to be in need of a series of booster shots.

The place to begin may well involve the creation of an organizational structure, preferably in the Ohio Department of Education, to coordinate strategic planning designed

to accommodate the accelerating advance of technology. At the minimum, this structure should involve representation from industrial arts, vocational education, career education, and science education. A case could be made for broadening the representation to include special education, the Office of Sex Equity and possibly such areas as consumer education, home economics, and business education.

A vocational educator was thinking along these lines, although on a more limited scale, when he was interviewed in this study. He said:

> Somehow or other, there's going to have to be a structure that nurtures a sense of community between the industrial arts folks and the vocational folks. . . . Whether it's a formal structure or informal structure, there has to be some kind of a structure that both camps are committed to. . . .

Just as industrial arts program standards were not lightly reduced at the seventh and eighth grade levels, so should consideration of restoring such standards not be lightly undertaken. A careful assessment of the potential of the new industrial arts/technology curriculum should be made, and the experience of other states should be reviewed. In particular, attention should be given to New York State, where technology education has been mandated at the seventh- and eighth-grade level. [30]

This study established that school board members, superintendents, principals, curriculum administrators, guidance counselors, and other key categories of school personnel have little knowledge, and even less understanding, of the new approach to industrial arts/technology education. This suggests that leaders in the reform movement have a communication challenge on their hands.

The most immediate opportunity for industrial arts/technology education reformers to secure official sanction for the program they advocate may lie in the area of teacher-certification standards. The standards are currently under review, and industrial arts/technology education proponents have been actively involved in promoting their preferences. The position they have taken deserves careful consideration.

A modest increase in the allocation of vocational monies for industrial arts/technology education should bear positive results for each area. At the minimum, additional funds could be used to restore the third industrial arts position in the Ohio Department of Education. Staff resources thus augmented could be more fully engaged in helping classroom teachers make the transition to the new program and in disseminating

information about industrial arts/technology education to generalists in education. Practices employed by other states in allocating vocational monies to industrial arts should be studied carefully at the beginning of the next state budgeting cycle.

Other conclusions that seem warranted from this study may be stated as follows:

- Not enough is known about the existing program of industrial arts in Ohio's schools. Status studies were last conducted in 1959 and 1980. Twenty-one years is far too long to go between such studies. Status studies should be placed on a five-year cycle.

- While improvement efforts of necessity are being confined to the secondary school level, the elementary schools stand in great need of developmental work in the industrial arts area.

- The impact on industrial arts and vocational education of heavier graduation requirements and the specification of increased academic requirements in Ohio's high schools need thorough study and documentation.

- Industrial arts/technology education is, and should continue to be, part of general education and career education.

- Industrial arts/technology education should be regarded as essential for all pupils and not just as a pre-vocational experience for pupils headed for trades-and-industries programs.

- Industrial arts educators should become more active in the Ohio Vocational Association.

Recommendations

The following recommendations are based on the outcomes of this study. They are presented primarily for the consideration of the Ohio Department of Education; each of the State's school districts; and professional organizations and teacher-educators having specific responsibility for the advancement of industrial arts and vocational education in an age of accelerating technological change.

1. Conduct a new industrial arts/technology education status study by no later than the 1986-87 school year and repeat such a study every five years thereafter.

2. Establish a center, preferably in the Ohio Department of Education, for the development of strategic plans designed to help Ohio's schools cope successfully with the accelerating rate of technological change.

3. Develop a communication plan designed to inform target audiences of general educators about the characteristics of industrial arts/technology education.

4. Accelerate the workshop schedule designed to inform, support, and reinforce industrial arts teachers who are making the transition to industrial arts/technology education.

5. Initiate developmental work designed to introduce industrial arts/technology education in Ohio's elementary schools.

6. Assure that proposals relating to the certification of teachers of industrial arts/technology education are given due consideration.

7. Assure that proposals relating to the restoration of minimum program requirements for industrial arts/technology education at the seventh and eighth grade levels are given due consideration when Minimum Standards are reviewed.

8. Determine whether or not the interests of both industrial arts and vocational education would be better served by allocating additional vocational monies to allow for the restoration of the third industrial arts position to the Ohio Department of Education staff and for expanded dissemination and teacher-support activities relating to industrial arts/technology education.

References

1. Blankenbaker, E. Keith, et al. The Status of Ohio Industrial Arts -- 1980. Columbus: Ohio Department of Education, Division of Vocational Education, Industrial Arts Service, 1980, p. 1.

2. Phillips, Kenneth. "A Progression of Technology in Industrial Arts Education," Technology Education: A Perspective on Implementation (A publication of the American Industrial Arts Association), p. 17.

3. American Vocational Association. "Industrial Arts in Education" (Washington, D.C.: American Vocational Association, Inc.), p. 1.

4. The Technical Foundation of America. Industry & Technology Education. Lansing, Illinois: The Technical Foundation of America, p. 5.

5. Ohio Department of Education, Division of Vocational Education, Industrial Arts Service. "Philosophy of Industrial Arts in Ohio" (Columbus: Ohio Department of Education, Division of Vocational Education, Industrial Arts Service, 1978).

6. Dyrenfurth, Michael J. "Industrial Arts Works with Vocational Education." Presentation to the National Association of State Directors of Vocational Education at Anaheim, California, December 4, 1983, p. 21.

7. Ibid.

8. Phillips, op. cit., p. 17.

9. Savage, Ernest N., and Squier, Terry. "MANUFACTURING: Making the Square a Rectangle," The OIAA Newsletter, XXXIII, No. 2 (May, 1984), p. 18.

10. Waetjen, Walter B. "People and Culture in Our Technological Society," Technology Education: A Perspective on Implementation (A publication of the American Industrial Arts Association), p. 7.

11. Ray, Willis E. "Conceptualization of a Practical Arts Program Component for Junior High/Middle School Youth." Funding Proposal prepared for the Ohio Department of Education, Division of Vocational Education, p. 51.

12. Lux, Donald G. "Science and Technology: A New Alliance" (Columbus: The Ohio State University, Department of Industrial Technology Education.), p. 2.

13. Ibid.

14. The Technical Foundation of America, op. cit., p. 9.

15. Blankenbaker, E. Keith. "President's Message," The OIAA Newsletter, XXXIII, No. 3 (September, 1984), p. 1.

16. American Industrial Arts Association. "Technology Education: A Direction for the Profession," Technology Education: A Perspective on Implementation (A publication of the American Industrial Arts Association), p. 28.

17. Ibid.

18. The Ohio Industrial Arts Association. "OIAA Long-Range Plan Implemented," The OIAA Newsletter, XXXIII, No. 3 (September, 1984), p. 3.

19. Blankenbaker et al., op. cit., p. 32.

20. Ibid.

21. Ibid.

22. Ibid., p. 29.

23. Ohio Department of Education, Division of Elementary and Secondary Education. "1984 Curriculum Survey" (Columbus: Ohio Department of Education, Division of Elementary and Secondary Education, 1984), p. 19.

24. Ohio Department of Education. Elementary and Secondary School Minimum Standards. Columbus: Ohio Department of Education, 1983, pp. 8-9.

25. Dyrenfurth, op. cit., pp. 8-9.

26. Ibid., p. 5.

27. "Technology Education: Where Does the Funding Come From?" The Technology Teacher (March, 1985), pp. 4-7.

28. Joseph, Earl C. "An Introduction to Studying the Future." In Futurism in Education, edited by Stephen C. Hencley and James R. Yates (Berkeley, California: McCutchan Publishing Corp., 1974).

29. Bowers, G. Robert. "Industrial Arts, Wither Not," The OIAA Newsletter, XXXIV, No. 1 (January, 1985), p. 3.

30. Good, Jim. "New York's Technology Education Program," The OIAA Newsletter, XXXIV, No. 2 (May, 1985), p. 5.